

**High Mobility Heterojunction Complementary Field Effect Transistors and
Methods Thereof**

ABSTRACT OF THE INVENTION

5 A structure, and method of fabrication, for high performance field effect devices is disclosed. The MOS structures include a crystalline Si body of one conductivity type, a strained SiGe layer epitaxially grown on the Si body serving as a buried channel for holes, a Si layer epitaxially grown on the SiGe layer serving as a surface channel for electrons, and a source and a drain containing an epitaxially deposited, strained SiGe of opposing conductivity type than the Si body. The SiGe source/drain forms a heterojunction and a metallurgical junction with the Si body that coincide with each other with a tolerance of less than about 10nm, and preferably less than about 5nm. The heterostructure source/drain is instrumental in reducing short channel effects. These structures are especially advantageous for PMOS due to increased hole mobility in the 10 compressively strained SiGe channel. Representative embodiments include CMOS 15 structures on bulk and on SOI.